Composition of Matter

A paper read October 29, 1914, before the Examining Corps of the United States Patent Office

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WASHINGTON, D. C.
1914.

THE LAW REPORTER PRINTING COMPANY, WASHINGTON, D. C.

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One of the four classes of inventions named in the Statutes as the subject of patent protection is Composition of Matter. There is no restriction in this country as to the nature of the compositions which may be patented except that they must be new, useful and the result of invention.

Many other countries have restrictions as to the compositions which may be patented. The principal substances which are refused patent protection by them are foods, beverages, medicines or pharmaceutical preparations and the product of a chemical process. Austria, Germany, Japan, Russia and Switzerland will not grant patents on foods, medicines or chemical products though processes of making them may be patented except in Switzerland and as to medicines, in Austria. Denmark will not patent medicines or articles of food or processes of making articles of food. Sweden will grant patents on processes of making foods or medicines, but not on the product. France, Italy, Spain, Peru and Venezuela refuse patents on medicines and pharmaceutical preparations of all kinds. Portugal will not patent chemical or pharmaceutical products. Great Britain and her colonies grant patents on all the classes of compositions that are patentable in this country.

No good reason is seen why a meritorious foodstuff or chemical product should not be given patent protection, but it seems proper that medicinal preparations should be denied this protection on the ground of public policy, for the reason that the granting of patents upon such mixtures enables unscrupulous makers of such compositions to impose upon the credulous and ignorant by representing that the medicine has been endorsed by

the Government as is evidenced by the fact that a patent has been granted upon it.

Robinson defines a composition of matter as being "an instrument formed by the intermixture of two or more ingredients and possessing properties which belong to none of these ingredients in their separate state." Lane *vs.* Levi, 104 O. G., defines a patentable composition of matter as one that is produced by the intermixture of two or more specific ingredients and possessing properties pertaining to none of those ingredients separately, thereby accomplishing a new and useful result. These definitions are not to be construed as meaning that the product must have no properties in common with its ingredients but that the intermixture must develop a property or one or more properties which the ingredients individually do not possess. Lane *vs.* Levi is not quite accurate in stating that a new result must be accomplished. The result may be old if the means is new.

According to Walker the phrase "'Composition of Matter,' as used in the Statutes, covers all compositions of two or more substances. It includes, therefore, all composite articles, whether they be the result of chemical union or of mechanical mixture and whether they be fluids, powders or solids. To be the subject of a patent a composition of matter must . . . be able to endure the relevant tests of invention, novelty and utility."

Chemical compounds will be considered as coming under compositions of matter in this paper, though they are very often referred to as articles of manufacture in the patents. The fact that in chemical compounds the component elements will combine only according to certain definite laws as to proportion, which is not true of non-chemical compositions, is no good reason for excluding them. They certainly are not simple substances and they meet the definition and tests of a composition as laid down by Robinson and the courts.

The intermixture of the ingredients in making a composition may be by mechanical or chemical operations or a combination of both. The result of the operation may be a mixture which can be separated into its constituent ingredients by purely mechanical means. Thus a mixture of iron filings and sulphur is an example of a

composition in which the iron and sulphur may be detected in the mixture with a microscope and the iron may be removed from the sulphur by means of a magnet. Or if some or all of the ingredients have chemically combined, the new substance resulting can be analyzed only by the joint use of mechanical and chemical means or only by chemical means depending upon the extent of the chemical combination between the ingredients. For example, if the iron filings and sulphur be mixed in the proportion of seven iron and four sulphur and heated, the ingredients will react and the compound iron sulphide will result whose properties are entirely different from its elements and whose constituent elements can not be detected by mechanical means but only by chemical analysis. The properties of the new product may be novel, never before having been possessed by any substance, or they may be old in themselves but new as to that particular association of ingredients and amount to an old result produced by a new means.

In chemical compositions the ingredients, while capable of independent existence, so far lose their identity and individuality when combined as to be no longer capable of being distinguished in the combination. Their mode of operation to produce the composition is also undiscernible. This may be true also in some compositions which are not composed of chemically combined ingredients. Opposed to this class of compositions are those in which the individuality of the ingredients is not wholly obscured and the method by which each ingredient performs its office in the combination is discernible. Between these two extreme classes there are compositions in which the individuality and mode of operation of some of the ingredients may be discernible while that of others may not be. In some compositions it is very difficult to determine whether ingredients have combined chemically or whether they are merely mechanically associated.

Alloys perhaps furnish the simplest and best example of the various kinds of compositions since they may vary all the way from true chemical compounds through mixtures of chemically combined metals with solutions of one metal in another in varying proportions, solutions

of metals in each other, mixtures of metals and solutions of metals, to mechanical mixtures of metals. Thus tin and copper will alloy in all proportions, but certain definite proportions of them form alloys having the characteristics of true chemical compounds. Other alloys of them apparently are solutions of one in another, also containing some of the true chemically combined metal. Lead and copper on the other hand will not combine with or dissolve in each other and their alloys are mechanical mixtures and difficult to make homogeneous owing to the tendency of the lead to segregate to the bottom of the ingot on cooling. Also the lead can be separated from the copper by heating to above the melting point of lead but lower than that of copper. Copper and tin can not be thus separated.

The invention in a composition of matter "is a substance possessing certain properties and formed by uniting certain other substances in a peculiar manner. Its identity depends upon the identity of its constituent elements, identity of their co-operative law and upon the identity of the properties exhibited in the composition as a whole. In this respect it resembles a true combination, and like other combinations its identity is lost by the removal or substantial change of any of its elements or by the introduction of a new ingredient which calls into activity some elemental force hitherto absent or inoperative, or by the union of its present elements under a new co-operative-law." (Robinson Article 301.) In support of the above Robinson cites decisions to the effect that where one composition of matter contains ingredients not present nor represented by equivalents in the other the two are essentially different. But that the absence of an immaterial ingredient from one which is included in the other does not make the two distinct. That though substances contained in two compositions may be different in themselves, yet if they serve the same purpose the compositions may be patentably the same. That a composition composed of certain ingredients of a certain quality intermixed in a specified manner and possessing certain properties is not identical with a composition formed of the same ingredients without reference to quality or mode of intermixture and possessing different properties.

The fact that a composition contains an ingredient not contained in another does not necessarily mean that it is not an infringement of the second if the new ingredient does not change the essential properties of the composition. "There may be infringements of a combination patent by adding an element or an ingredient to obtain the same result or substantially the same, but not by leaving out an ingredient or an element of the combination and not substituting an equivalent." Standard Paint Co. *vs.* Bird, 175 F. R., 346.

A composition of matter though regarded as a combination is governed by rules peculiar to itself. Elements of a mechanical combination are identical or equivalents only when in their individual character they are the same operative means, not merely furnishing to the combination the same subordinate function but performing this by the same mode of operation. In the mechanical combinations the individuality of the constituent parts is not obscured and the mode of operation of each part is discernible. The identity of such a combination is determined by the identity of the individual parts of which it is made up, the identity of the way in which the parts co-operate and the identity of the resultant qualities inhering in the combination as a whole. In a composition of matter such a test is not always possible. In some mechanical compositions in which the identity and individuality of the ingredients is not wholly obscured the method in which each ingredient performs its part in the combination is discernible. In such a composition the tests of identity are the same as in other mechanical combinations, not only the means must be identical but the manner in which it co-operates with the other elements must be the same. A good example of a composition in which the mode of operation of the ingredients is discernible is one from the very active art of mixtures for automatically closing punctures in pneumatic tires, called "tire healers." A typical composition of this kind consists of asbestos fibre, whiting, flour, glucose, water and salt. In such a composition the office of the asbestos fibre is to form a network of fibres in the puncture when forced into it by the escaping air. This network traps and holds the fine particles of

whiting, which are insoluble and also the finer particles of flour thus closing up the openings in the fibre mass. The flour and water and the glucose form a glutinous vehicle for the asbestos and whiting. The salt acts both as a preservative and to lower the freezing point of the mixture. In such a mixture cotton or wood fibre will be the equivalent of asbestos, magnesia, cement, silica, and finely divided insoluble solids generally the equivalent of whiting, starch will be the equivalent of flour and alcohol will be the equivalent of salt.

In other mechanical and in all chemical compositions however, the individuality of the ingredients is lost and though it may be known that each ingredient affects the properties of the compound, the operative law by which it produces its effect may be entirely undiscernible. In such cases the rule that elements are to be regarded as the same only when they serve the same purpose in the combination and operate in the same way to effect this purpose, is both useless and unreasonable. To quote from Robinson:

> "The law requires no further certainty than science can afford, and when no evidence of the identity of two ingredients can be obtained except that they perform the same function in the composition, this evidence is accepted as sufficient and the ingredients are held to be the same. The doctrine of equivalents in reference to compositions of matter thus differs according to the nature of the composition and the state of the scientific knowledge. In compositions where the mode in which the indivdual ingredients furnish to the composition the required elemental force is ascertainable, equivalence is determined by the rule that governs other combinations; otherwise the rule follows that applied to simple arts and instruments and all ingredients are equivalents which at the date of the patent were known as possessing properties that in the given composition make them interchangeable."

The limitation of equivalents to substances known at the date of the patent is not according to the later de-

cisions. In addition to known substances the judge stated in Read, Haliday & Sons *vs.* Schuelze-Berge, 78 F. R., 493, that:

> "In the light of the later decisions on the subject I think the law must be that where the new ingredient is such as would have been known to or employed by the ordinary skilled practical chemist or is such as would naturally have developed in the growth of the art, and the substitution thereof involves no alteration or new operation or result, it is covered by the patent provided the specifications and claims are sufficiently broad to include it. If, on the other hand, the development of the new ingredient required the exercise of the creative or inventive faculty, and certainly if its introduction causes some novelty in function or result, it would not be an equivalent."

In Bridgeport Wood Finish Co. *vs.* Hooper, 20 O. G., 156, it was held that:

> "In a wood filler composition silicious marl is not the equivalent of pulverized quartz inasmuch as, though they both consist of oxide of silicon, they are physically and practically different for the purpose of wood filling because the former consists of rounded water worn grains while the powdered quartz consists of angular sharp-edged fragments."

This is an example of a case where the mode in which the ingredients act is ascertainable. In Hoskins Manufacturing Co. *vs.* General Electric Co., F. R., 212, 422, a resistance element composed of an alloy of nickel 65 per cent, chromium 12 per cent, iron 15 per cent, and manganese 8 per cent, was held to be an infringement of a resistance element composed of alloy of nickel and chromium upon the theory that the addition of the iron and manganese did not materially change the alloy as a resistance element and therefore was considered to be the same as the latter. In other words, chromium, iron and manganese were held to be the equivalent of chromium in so far as the properties of the alloy when used

for resistance elements are concerned. The iron and manganese changed the alloy as to other properties, however, and considered as compositions of matter the nickel-chromium-iron-manganese alloy is not the same composition of matter as the alloy of nickel and chromium and it is not understood that the court so held. The question before the court related to an article of manufacture, a resistance element, rather than the question of whether the alloy itself, aside from any special application of it, was infringed. The alloy *per se* clearly was not infringed and if it had been used by the defendants, not for making resistance elements, but for making cutting instruments, for example, for which it is adapted, there is no doubt whatever in my mind that the court would have ruled that there was no infringement of the patent. In a case recently decided by Judge Hough, not yet reported (Friebacher *vs.* Roessler & Hasslacher Chemical Co.), it was held that a pyrophoric alloy composed of cerium and magnesium and treated with hydrogen infringed a claim reading "A pyrophoric alloy containing cerium alloyed with iron substantially as and for the purpose specified." This was held to be a pioneer invention and the manganese and hydrogen were held to be the equivalents of iron. Apparently the court has held in this case that *any* metal which when alloyed with cerium will produce a pyrophoric alloy, is an equivalent of iron. The last two cases cited are examples of equivalency being determined by result in the final product where the mode in which the elements operate to produce the result is undiscernible.

The same diversity of rule obtains in determining the identity of the co-operative laws of ingredients as in determining identity of ingredients. If the mode of action of the ingredients is discernible, then the co-operative law is perceptible and should be considered in determining identity of compositions. But if the identity of the ingredients is lost and their mode of action to produce their effects in the composition can not be determined, nothing is then known as to their co-operative law, and it must be regarded as the same in every grouping of the same ingredients which produces the same result.

Briefly, then, the logical way of comparing two compositions to see whether they are patentably the same is to compare first their characteristic properties. If these are different the two compositions are, of course, different, but if they are the same then the identity of the constituent elements must be considered. When the character of the composition is such that the mode of action of each ingredient is discernible, then the elements of each are identical only when their mode of action and effect are both the same. But in compositions in which the mode of action of the ingredients is not discernible the elements are considered to be identical if known as being interchangeable without affecting the essential properties of the complete composition. If the ingredients and the properties of the final composition are the same it is safe to assume that the compositions are identical without inquiring into the nature of the reactions between the ingredients, though Robinson states that differences in mode of mixing, or proportions of the same ingredients, or different reactions though producing the same result may possibly produce patentably different compositions though it is improbable. He cites no specific example of two such compositions, and his contention appears to be more hypothetical than practical. Robinson here is inconsistent with the statement he makes in Article 197 "that the artificial combination of ingredients into a substance which exists in nature is simply a new process for the production of that substance, not the creation of a new substance, and in such cases the process and not the substance is the patentable invention." It is improbable that the method followed by man in making the substance is precisely that by which it was formed in nature.

In its essentials a specification of a composition case does not differ from that of any other class of invention. Rule 35 states that the specification must set forth the precise invention for which a patent is solicited and explain the principle thereof and the best mode in which applicant has contemplated applying that principle in such manner as to distinguish it from other inventions. A composition presents three essential subjects for description, the ingredients, the manner of combining them

and the properties and nature of the resulting product. Each of the ingredients should be described in such manner that those skilled in the art may know exactly what is meant to be included. A great many applications that come before me are defective in this particular, owing to the use of indefinite and inaccurate terms in defining ingredients. This results in many cases from the loose use of chemical terms, such, for example, as using the word "soda" when referring to a salt or compound of sodium other than sodium carbonate, and it is difficult or impossible to tell from the context what particular compound is meant. When chemical substances are referred to the safest rule is to designate them by their correct chemical names instead of their old or colloquial names. If thus defined or designated, or the formula stated no question can thereafter arise as to what is meant. If a term has a definite accepted meaning in an art, though not strictly accurate, that is sufficient, since all that is required is that the substance be defined so that there is no question as to what is meant. Loose, indefinite terms are quite frequent in applications for paint compositions in such terms as "varnish," "drier," "Japan," etc., and in alloy cases in such terms as "brass," "bronze," "white metal," to designate ingredients. When it is taken into consideration that there are many kinds of varnishes, Japans, and driers and of brasses, bronzes, and white metals, differing in composition and many of them in a great degree, it is seen that such terms do not meet the requirement of the rules as to definite disclosure. It would be possible to make up a composition having the ingredients named in such a description and in the same proportions, and yet the resulting composition would differ materially from that which the applicant had in mind, because his varnish, Japan or drier, or his brass, bronze or white metal was different from the ones used by the other. Such a description is bad also because it does not disclose the invention sufficiently to enable the Examiner to make intelligent search on the case, since there may be a reference containing all the primary ingredients of the composition of the application, defined by their proper names without any statement as to whether some of them when mixed

will form a varnish, for example, and yet it could not be known that it was a reference because the specification as drawn did not indicate the composition of the particular varnish, which applicant was using and had in mind. In the absence of precise information the best the Examiner can do is to consider that any substance known under the names referred to comes within the scope of the invention and act accordingly. The proper way to specify the real ingredients in the case using brass, for example, is to state the composition of the brass, or to indicate how much copper and zinc are added in the form of a brass.

As another example I have a case pending before me now in which one of the ingredients is "Terra Alba." Terra Alba by one authority is a fine white clay known as pipe clay, by another authority it is defined as finely pulverized gypsum. These are two quite different substances and I do not know and can not tell from the case which one the applicant means. Such a description is defective.

Another frequent source of trouble is the use of trade names of products, the composition of which is not known and which may be secret preparations. Thus "Three-in-One" oil is a secret preparation and it is impossible for the Examiner to determine whether a composition is novel or not in which this is included as an ingredient. There is another objection to the designation of ingredients by trade names. One of the reasons why inventors are given the exclusive right to make, use and sell the product of their inventive skill is the benefit that accrues to the public by the publication of the invention. In order to fulfill this obligation in return for his patent the patentee must fully disclose the invention to the public. The designation of ingredients by trade names, the composition of the ingredient being unknown or indefinite, does not necessarily comply with this obligation, since the manufacturers may cease to manufacture it, or vary its composition and yet continue to sell it under the same name. These changes may be such that the substance will no longer perform the same function in the composition as did the substance of the same name used by the inventor when he made his

invention. There is no guarantee, therefore, that the public will ever come into possession of the invention.

The failure to indicate the ingredients by their proper names may be a fatal defect and not subject to correction by amendment. The Court of Appeals of the District held in *Re* Mraz, C. D., 1911, 316, that a claim for a composition "comprising gelatin, glycerine and bone meal" was properly refused on the ground it was not disclosed in the application as filed which described the composition as consisting of "gelatin, glycerine and an oxygenated solution." Appellant alleged that the term "oxygenated solution" was an error and that "bone meal" was meant, but it was held that bone meal "was foreign to the application as filed, and that it is incumbent under Rule 70 for an applicant to correctly describe his invention in the original application. A failure to comply with its requirements can not be cured by amendment but requires a new application." The Board of Examiners-in-Chief in this same case held that "even if the term used originally were held to generically include the latter, there is no authority for allowing an applicant to include and claim a specific thing not originally described merely because it comes within the scope of the genus before disclosed." There are cases, though, when the mistake in the use of terms arises in such a way that the correction should be permitted. I recall a case which arose in Division 3 in which the description and claims called for "sandstone" as an ingredient of a battery depolarizer. The claims were rejected as being inoperative since sandstone has no depolarizing properties. An amendment was then presented substituting "manganese dioxide" for sandstone and was finally admitted by the Commissioner upon the filing of a statement under oath as to how the error arose. The error was caused by an altogether too free translation, by one who was not a chemist, of the German word "Braunstein," meaning manganese dioxide. This word which should not have been translated at all was tranlated "brownstone" and as the attorney was aware that there is a sandstone called "brownstone" he assumed that the applicant was using this species of

sandstone as a depolarizer and claimed it broadly. A very logical conclusion, but it led him far afield.

In specifying the ingredients none should be specified which is not essential to the composition. If any ingredients can be dispensed with it should be so stated in the description or no claim can properly be made for the composition with that ingredient omitted. Also the nature and number of the ingredients should be so stated that experiment is not necessary to determine what may be used.

In describing the manner of producing the composition, the proportions of the ingredients and the process of compounding them should be correctly and precisely stated so that one skilled in the art can produce it without the necessity of experiment. In Tyler *vs.* Boston, 7 Wallace, 327, Judge Grier states:

> "A discovery of a new substance by means of chemical combinations of known substances is empirical and discovered by experiment. Where a patent is claimed for such a discovery, it should state the component parts with clearness and precision and not leave the person attempting to use the discovery to find it out by experiment. . . . The art is new and therefore persons can not be presumed to be skilled in it or to anticipate the result of chemical combinations not in daily use."
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> "In a process patent the teachings of the specification and the disclosure by the patentee must be such that after the patent has expired, a user thereof shall not be left to the blind groping of experimental work, but by plain teaching of the specification be enabled to use the process with certainty." Krupp *vs.* Midvale Steel Co., 191 F. R., 588.

The same principle, of course, applies to the description of the method of making a composition of matter, since the intermixture of ingredients is an art or process.

It is not necessary that the theory of action of the

ingredients be known or stated in the description, though if it is known it is preferable to state it.

> "Where the specification of a patent covering a process involving the use of chemical elements or compounds defines the ingredients so that there can be no mistake as to what the patentee means, and has indicated a process which will transform those ingredients into that which is declared to be invention, it makes not a particle of difference that he was wholly ignorant of all the chemical changes that took place in the course of the process." National Enameling Co. *vs.* New England Enameling Co., 139 F. R., 643.
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> "When a patent contains sufficient disclosure of the claimed invention it will not be invalidated either by the failure of the patentee to state the causes which produce the result or by mistaken statement as to the reasons therefor." Hemalin Co. *vs.* Harvey Dyewood and Extract Manufacturing Co., 138 F. R., 54.

The nature of the resulting composition should be defined by a statement of its peculiar physical or chemical characteristics if possible.

Usually compositions are devised for some particular use, such as a paint, fertilizer, explosive, etc., and the use or uses to which they are intended to be put should be set forth in the description. In order to be patentable the composition must have utility. This may be assumed for some products such as new chemical compounds, but as to others the utility of the product should be specified.

The claims in composition cases often introduce questions which seldom or never arise in connection with the claims in machine and process cases, particularly the former. As a rule inventors devise or invent a specific composition to meet some definite want. The ingredients involved have to be mixed within certain limits or proportions or in a certain manner to get a composition which will have the desired properties. The description sets forth such a composition and too often says nothing about equivalents, whether or not proportions may be varied or whether or not some ingredient or ingredients

may be omitted without any material change in the resulting product. Claims are presented which merely enumerate the ingredients without any reference to proportions, or which omit some of the ingredients, or two or more claims are presented each of which contains an ingredient not included in the other. Thus if the composition contains ingredients a, b, c, d, e, one claim will be drawn to a, b, c, another to b, d, e, another to a, c, d, etc. Are such claims proper?

As to the omission of proportions, Walker states in Article 119 that the claim "should either expressly or by reference to the description specify the respective proportions which the different ingredients bear to each other." Judge Townsend in Panzl *vs.* Battle Island Paper Co., 138 F. R., 48, ruled as follows:

> "The first and second claims were drawn to cover a combination of substances old in the art, the patentability of which is asserted upon the theory that thereby a new result is produced. No proportions are given, however, and it would require experiment to determine what proportions are necessary to secure the result. These claims must be held invalid therefore, either because it does not appear that they disclose any invention in view of the prior art, or because they fail to acquaint those skilled in the art with the necessary information to enable them to practice the invention without experiment."

Walker and Judge Townsend both relied upon Tyler *vs.* Boston as authority for their statements. This decision, however, does not relate to *claims*, but has reference to the *description*. The real reason why such a claim is bad is because it is too broad and is beyond the scope of the invention, proportions being essential. The person who has discovered that certain ingredients mixed in certain proportions will produce a certain composition of matter has not discovered every composition of matter which may be made from those ingredients nor is he entitled to the broadest possible claim for a composition containing those ingredients though the contention is constantly being made in the prosecution of

cases that he is. As well say that an inventor of a machine containing certain mechanical elemental parts arranged in a certain relation is entitled to a claim which will cover every possible arrangement of those mechanical elements. An inventor is entitled to the broadest possible claim within the scope of *his invention* and no broader.

While the rule stated by Walker is not supported by the authority he cites it is nevertheless a good rule that in claims for compositions of matter in which proportions are essential the proportions should be specified either directly or by reference to the specification, or the identifying and distinguishing characteristics of the composition should be stated in lieu of proportions. The latter is the better practice, though requiring more skill and care in drafting the claim, because it more fully protects the real invention. It is possible that other combinations of the ingredients or their equivalents may produce a composition having substantially the same properties.

Claims omitting ingredients which the specification does not state may be omitted are without basis in the case since they are not for the applicant's invention. Identity is lost by omission of an essential ingredient. Robinson, 302; Walker, 369. This is a very common fault with composition claims. The omission of an essential ingredient makes a new composition. In a machine case whether an element is essential or not can be told by inspection. This, as a rule, is not so in composition cases, but only by experiment can the essentiality of ingredients be determined. Therefore in the absence of a statement that it is not essential an element is considered essential unless it is obvious that it may be omitted, for example, one which is added for merely fanciful effect, such as a coloring or a flavoring ingredient. If an ingredient merely improves the composition and is not absolutely essential, claims may be drawn both including and omitting it. *Ex parte* Hentz, 26 O. G., 437. But even in such a case a proper basis for the omission of such an ingredient should be laid in the description.

If the specification lays a basis for the omission of certain ingredients the claims which do not include all

the ingredients should be so worded as not to limit them to the ingredients enumerated therein. The phrases "consisting of" and "composed of" are limiting in effect while "containing" or "comprising" are broader terms. Hoskins Manufacturing Co. *vs.* General Electric Co. A claim for a composition "consisting of" a, b, c, and d, is a different invention from one for a composition "consisting of" a, b, and c. *Ex parte* Gleason, 108 Commissioner's MSS., Dec., 311. There is no analogy between compositions and machines in this respect. In a machine case claims may be drawn to the complete machine and to subcombinations of it. But the subcombinations do not lose their identity whether associated with other elements to form the machine or considered by themselves. A single reference can anticipate all of them since it is not necessary to show the subcombination by itself to anticipate it. In the case of the composition the ingredients may entirely lose their identity and their mode of operation is seldom discernible and a single reference will not meet a composition "composed of" a, b, c, and d and one "composed of" a, b, and c. Such claims are limited to the precise ingredients mentioned in each, no more and no less. They do not stand in the relation of genus and species to each other nor as combination and subcombination. If the word "comprise" be substituted for "composed of" in the claim containing a, b, and c, it may be considered as generic to the other since it is not now limited to a, b, and c, but may contain other ingredients; but even then essential ingredients should not be omitted. Objection has been made to this type of claim on the ground of indefiniteness (*Ex parte* Gleason, cited above), but it is no more indefinite than machine claims in which analogous expressions are used, and if the nature of the composition is also indicated in the claim by properties there can surely be no serious objection to this type of claim.

As to claims each of which contains ingredients not named in the others the Board of Examiners-in-Chief has held such claims to cover different species in *Ex parte* Inskeep, vol. 77, page 169 (Patent 806,976). The claims were as follows:

> (1) "Fumigating composition containing sulphur and hickory bark."

(2) "Fumigating composition containing sulphur and licorice."

(3) "Fumigating composition containing sulphur and lemon peel."

The complete compound contained all the above ingredients. The board said:

> "We are aware of no decision which authorizes the retention in the same application of claims which respectively include one element of a composition of matter associated with other and independent elements of that composition and we apprehend that no decision will ever be rendered authorizing such a practice; in fact, the decision in the case of *Ex parte* Eagle, which has never been overruled, distinctly forbids it. The fact that each claim can be read upon the complete mixture is not conclusive."

Almost invariably in cases of this kind which have come to my attention there has been no basis in the description for this type of claim and the inventor never had in mind the idea of juggling the ingredients of his composition in the manner covered by the claims. It would be a very unusual combination in which the various elements may be indiscriminately omitted without changing the invention. In such a composition many of the ingredients must be non-essential and instead of the complete mixture being a combination it is very likely an aggregation of substances.

The real test, however, in all the above types of claims is, Do the various claims cover a single invention? This must be determined for each case. If they do they should be permitted together. If they do not they should not be permitted together. The form of the claim is a secondary matter.

In selecting terms to define ingredients of a composition generically there is danger of choosing terms which are too comprehensive. In Bracewell *vs.* Passaic Print Works, 107 F. R., 467, the use of zinc oxide, hydrate, or carbonate seemed to be imperative to the success of the process. The applicant, however, stated that any zinc

compound may be employed with good results, which statement was incorrect since it was proved that a large number of them would not do so. Judge Coxe said:

> "It can not be contended that the patentee knew that his statement that any zinc compound would operate successfully was false, but it is manifest that he did not know that it was true and he should have known it was true before he inserted it in his description and made his corresponding claim. He stretched his net to catch as infringers all users of zinc compounds and if he stretched it to the breaking point he has only himself to blame. The courts should be liberal in construing patents, but they can not rewrite the description and claims, they can not construct an entirely new patent even to save a meritorious invention. If the complainant's contention be correct a patentee can claim blindly an entire group of compounds, relying on the court, after subsequent investigation and experiment, to limit the claim to the one which gives the best results. This will not do."

In Matheson *vs.* Campbell, 79 O. G., 686, it was alleged by the patentees that any sulpho-acid treated by their process would give a "color-producing black" and that therefore all sulpho-acids were equivalents. Judge Lacombe ruled that:

> "The inventors did not make any such 'broad discovery.' They made the specific discovery that some disulfo-acids treated according to their process would produce their product. The broad discovery that all sulfo-acids may be thus transformed they certainly did not discover . . . since most of them can not be thus transformed by the process of the patent. . . . We are referred to no authority and know of no principle which will sustain applicant's contention that he can thus . . . speculate on the equivalents of his claimed invention, and thereby oblige the public to resort to experiments in order to determine the scope of the claims of the patent."

But in *In re* Ellis, 167 O. G., 203, the court held that:

> "A term broad enough to cover substances not contemplated by the inventor is not objectionable where fifteen or twenty substances were named in the specification as suitable and it does not appear that there is any other term which is accurately generic to those named."

In defining ingredients generically, by statement of characteristics common to the several specific substances intended to be included, the characteristics or properties relied upon should be essential ones and not mere incidental ones which may be had in common by the substances but which are immaterial in so far as the particular composition is concerned. For example, in a non-corrodible alloy in which gold, platinum and iridium may be used interchangeably on account of their resistance to oxidation, and their specific gravity is unimportant, to define them in the claim as "heavy metals" is improper, since, while they *are* heavy metals, it is not this property which makes them equivalent in the alloy. Such a claim does not properly protect the invention since some heavy metals readily oxidize, and the claim would not cover alloys in which difficulty oxidizable metals not of high specific gravity are used. This is a fault which is quite common in drawing generic claims in composition and process cases. It is very seldom met with in mechanical cases because the function of the elements there is more evident and the common property which is utilized more readily appreciated. Essential, not non-essential, properties should be specified in identifying the ingredients.

There is very often difficulty in defining generically a number of substances which it is found produce substantially the same result in the composition, due to the lack of a generic term, none ever have been coined to fit the case; or it may be that investigation has not been carried to the extent of finding the common essential property of the interchangeable substances. In the latter case there may be a question as to whether the inventor has yet made the generic invention or discovery, or has merely made a number of specific inventions. In some

such cases applicants have been permitted to define the invention by the use of alternative expressions by specifying the various interchangeable substances in the claims. No objection is seen to this in cases where the substances are equivalents since the claim is construed to cover equivalents anyhow. But in cases where the substances are not equivalent, but relate to different species, the use of alternatives is at best a makeshift, since such a claim is not a true generic claim, covering an unlimited number of substances having a common essential property, but is what might be termed an "omnibus" claim, covering a definite number of designated species.

It is often hard to define a composition except by reference to the process of making it. Apparently, if a substance is different from another substance the particulars in which it is different can be pointed out. Otherwise, how is it known that it is different? However, claims have been sanctioned in cases where the differences though recognized are difficult to define. "A composition of matter may be described as a result of a described process where there is no clear way of delineating it." Analin *vs.* Higgins, 15 Blachford. Also Goodyear *vs.* Railroad, 1 Fisher, 626, and *Ex parte* Painter, C. D., 1891. In such cases though nothing can be held to infringe the substance, however closely it resembles it, unless it can be shown that it is made by the same process. Cochran *vs.* Badische Analin Soda Fabrik, 111 U. S., 310, and Plummer *vs.* Sargent, 120 U. S., 448.

Another quite common form of claim presented in composition cases is that in which attempt is made to define the product by stating that it is composed of the materials which are mixed together in making it. This is somewhat analogous to defining by reference to the process but is not the same and is objectionable in all compositions wherein the starting substances lose their identity or react with each other upon being brought together to form new substances. Such a composition should be defined by stating its own inherent properties not those of the materials out of which it was manufactured, because they do not exist as such in the final product and in most cases it is impossible to tell by an examination

of the product what substances were combined to produce it. If it is impossible to thus define it it should be claimed by reference to the process of making it.

If novelty were the only question to be considered in the examination of compositions they would be comparatively easy cases to handle. But the questions of utility, whether they are aggregations or true combinations, whether their compounding involves more than expected skill of the artisan are continually coming up and they are perplexing questions. In mechanical cases the function of each part is apparent or can be easily determined since there are but few laws of action to consider. This is not so in composition cases. Sometimes most surprising results are obtained in combining two well-known substances and it is often impossible to foresee the result. For example, an alloy of 24 per cent nickel and 76 per cent iron has a higher co-efficient of expansion than either metal alone, but if the nickel be increased to about 36 per cent the resulting alloy, "Invar," has an almost negligible co-efficient of expansion, being less than one-twelfth that of either iron or nickel. Whether an ingredient is essential or merely added for the purpose of avoiding an old substance is not easy to determine. Some ingredients may be like the celebrated "soup stone" which it was said would produce an excellent soup if placed in water and meat vegetables and seasoning ingredients added and the mixture allowed to simmer several hours.

The question whether or not the new use of an old substance or composition entitles the inventor to a patent to the composition comes up very often. The composition *per se* is not repatentable because it has been put to a new use, but it is usually very hard to convince the applicant of this. A new name does not make the composition new. "The new use of a composition of matter is not a new composition of matter but a new process for effecting in the new object some desired result." Robinson, Article 270. "The plaintiffs can not because of the use to which they apply the composition claim that they are first and original inventors of the composition." U. S. and Foreign Salamander Felting Co, *vs.* Howe, 9 O. G., 1875.

Also attempt is often made to claim an old substance because it is made in a new way or from new starting materials. Here, again, the composition is not repatentable. In Cochran *vs.* Badische, cited above, it was held:

> "That while a new process of producing it (alizarine) was patentable the product itself could not be patented even if it was a product made artificially for the first time in contradistinction to being eliminated from the madder root. Calling it alizarine did not make it a new composition and patentable as such."

In England a composition first made commercially is patentable, although before known as a chemical curiosity. Cyk., 30-826. A purified substance which has existed in an impure state may be patentable. In Parke Davis *vs.* Mulford, 189 F. R., 95 (the adrenalin case), it was held that:

> "A substance extracted from animal tissue for medical use which is new practically and therapeutically may be patentable although it differs from previous preparations only in the degree of purity."

And in Kuehmsted *vs.* Farbenfabriken of Elberfeld Co., 179 F. R., 701 (the aspirin case), it was held that a product made for the first time in a sufficiently pure state to render it therapeutically available is patentable.

Compositions differ from mechanical inventions in that generaly they can be very readily briefed for search purposes by the card index system or on large sheets where there are a limited number of ingredients, as in alloys, which class has been well briefed. The other composition classes are either not briefed at all or only partially. To brief them properly requires care and takes time. A carelessly prepared brief is valueless since it can not be relied upon. The search of compositions extends much beyond the patented art and in some

classes is more in the technical periodicals and books than in the patents. The time it would take to brief the various composition arts would, in my opinion, be well expended and more than compensated by the time afterward saved in making searches. As to the determination of equivalency, operativeness and utility this would require, in order to be properly done, a well-equipped laboratory with facilities for making the proper tests. I know of no good reason why the Patent Office should not have such a laboratory.

OCTOBER 29, 1914.